cc. PT.
JMG.

A-2
12/21/90

Patterson Schafer, Incorporated

Environmental Consultants

P/T

December 21, 1990

Mr. John Staples
Environmental Engineer
Cerro Copper Products Co.
P. O. Box 66900
St. Louis, MO 63166-6800

Dear John:

As you know, we are currently having problems with zinc concentrations in the treated batches from the Building 19 Treatment Plant. Joe Burroughs sent us a copy of the data log for the past year. We noticed the elevated zinc values have occurred since the beginning of August, 1990. We also noted the treatment pH has risen from approximately 8.5 to 9.0. Unfortunately, the data Cerro normally takes to evaluate each treated batch is insufficient to determine where the problem is located. Cerro has tried, unsuccessfully, to make ad hoc field adjustments to both pH and polymer dosage, but the problem is still unresolved.

We thus recommended the following modification to the sampling procedure. We suggest taking multiple grab samples from each treated batch. Also, a grab sample of the raw, untreated influent should be taken and analyzed. All samples should be collected and analyzed daily.

These samples should be analyzed for both total and dissolved metals' concentrations. Each grab sample should be "split" in the field and coded. To the first portion, the sample is acidified, digested, and analyzed by Atomic Absorption Spectrophometry (AA). The values obtained are "total" concentrations. The second portion of the split should be filtered with a 0.45 um filter. The filtrate is then acidified and analyzed by AA. These results are "dissolved" concentrations. These results coupled with field temperature and pH measurements will enable us to assess the performance of the treatment plant. Note that pH and temperature both can directly affect the metals' solubilities. The reason for multiple samples from each batch is to allow us to calculate the standard deviation between analytical measurements. Finally, plasma measurements can also be made, and compared to those from the AA. According to the lab, the wavelength used by the plasma method is not the optimum for zinc. At low levels, operation at the non-optimum wavelength can cause errors in analytical results.

39 SOUTH LA SALLE STREET • SUITE 917 • CHICAGO, ILLINOIS 60603 • PHONE (312) 372-1100 • FAX (312) 372-7188

Five simple cases may describe the results:

1. If the total concentration equals the dissolved concentration, the problem may be with the treatment pH.

2. If the total concentration is greater than the dissolved concentration, then solid carryover is causing the elevated levels. A switch in polymer type or dosage may be needed.

3. If the total concentration is less than the dissolved concentration then there is a laboratory error.

4. If the magnitude of both of the concentration values is above the limit, then a problem with both pH and polymer exists.

5. There is a systematic analytical error. Note only the plasma zinc values are reported.

Once we have generated a good data base, we can evaluate each case and make any necessary adjustments.

If you have any questions or comments, please give me a call.

Cordially,

Edward J. Cooney
Project Engineer

EJC/jm

cc: J. Grana
J. Patterson
C. Schafer
N. Saadeh

900015.1

RE: Bucdo P/T

A-2
12/18/90

Patterson Schafer, Incorporated

Environmental Consultants

VIA FACSIMILE

December 18, 1990

Mr. Joseph Grana
Manager of Environmental and
Energy Affairs
Cerro Copper Products Company
P.O. Box 66800
St. Louis, MO 63166-6800

Dear Joe:

As you know, the results of adding polymer during the last piercing run were unsatisfactory. We were able to achieve some flocculation, but the residence time in the lamella was insufficient to produce extended particle growth. We believe adding a flocculation tank before the lamella will correct this problem.

Specifically, at a 40 - 45 gpm flow from the millwater tank, a 400 - 500 gal. floc. tank is required to provide a 10 minute detention time. Currently, the settled water tank (T-603) meets this specification. In fact, the system flows can be simplified using this configuration. First, a cationic polymer can be added either to the millwater tank or to the in-line mixer, prior to the floc. tank. Recall the cationic polymer changes the surface charge, allowing the anionic polymer to successfully coagulate the particles. A pH adjustment step in place of the cationic polymer was not as effective as the step-wise addition of polymers. Second, upflow into the settled water tank. We will need a variable speed mixer for the tank. If the tank can be elevated approximately 4 feet, we can overflow by gravity into the lamella. Third, the lamella can gravity flow directly into the reuse tank, eliminating the need for P603. Fourth, the reuse water tank is pumped to the heat exchanger. A portion of this stream, e.g. 5 gpm, is blown down through the backwash strainer to the sewer. The remaining, cooled water is returned to the piercer for use. Note that the system as currently valved can send all or part of the reuse water to the backwash strainer. Thus, all the system's water can be filtered if necessary.

C05879

39 SOUTH LA SALLE STREET • SUITE 917 • CHICAGO, ILLINOIS 60603 • PHONE (312) 372-1100 • FAX (312) 372-7188

If you have any questions or comments, please give me a call. Jim Patterson, John Staples, and I have reviewed this plan and believe it will enable the Building 80 treatment system to produce a better quality effluent.

Cordially,

Edward Cooney / E.C.

Edward J. Cooney
Project Engineer

cc: J. Staples
J. Lucey
J. Patterson

Enclosures

EJC/yd

900014